Review Article

Fish Comsumption Behavior during COVID-19 Pandemic in Bekasi City (Case Study in Pondok Ungu Permai)

ABSTRACT

The spread of the Coronavirus outbreak has in changes in people's consumption patterns, including the consumption of fish products. The purpose of this study was to analyze changes in fish consumption behavior, whats factors changes preference in fish consumption during the Covid-19 pandemic, and to analyze the understanding of the benefits of fish from consumers in the Pondok Ungu Permai. The method used is a case study with qualitative, quantitative, and descriptive data analysis. The sampling technique used and simple random sampling method with 82 respondents. The result showed changes in factors during the Covid-19 pandemic are the system and places of purchase, the frequency of fish consumption, the amount of consumption of fish products consumed, and the price of fish. Based on binary logistic regression analysis, before and after the Covid-19 pandemic, the Wald test showed that occupation had an influence on preferences between fresh fish and processed fish.

Keywords: Covid-19; consumption behavior; benefits of fish; preference; logistic regression

Comment [S1]: COVID-19.

The word COVID is written in CAPITAL LETTERS

Comment [S2]: Change these words, do not repeat the words in the title of the manuscript

1. INTRODUCTION

Coronavirus disease 2019 or often referred to as **Covid-19** was announced to the public by WHO (World Health Organization) in Indonesia on March 11, 2020. This virus originated from Wuhan, China. The increase in the number of virus cases is quite fast and has spread to various countries, including Indonesia. in connection with this virus, the Minister of Health issued a Decree of the Minister of Health Number HK.01.07 / MENKES / 104/ 2020 concerning the determination of Novel Coronavirus Infection as a type of disease that can cause outbreaks and efforts to Control Them, The spread of Covid-19 has many impact on political, social, cultural, public welfare, and especially economic aspects [1].

During the pandemic, the Ministry of Marine Affairs and Fisheries (KKP) through the Directorate General of Strengthene the Competitiveness of Marine and Fishery Products (PDSPKP) and continues to monitor the availability, development of fish supply and process in Indonesia. The Ministry of Maritime Affairs and Fisheries recommends that people continue to consume fish, even more. Because benefits of eat fish in pandemic situation is increase immunity and maintain a healthy body **because** fish has a complete nutrition [2].

Comment [S3]: Paraphrase this sentence

To prevent the spread of the coronavirus, the government has implemented a lockdown or stay at home system. One of the results is that the market is closed, the decline in demand for fish makes fish unsold. Consumer demand has

decreased in the market, as consumers prefer to buy other products that are sold online more often, while fresh fish is rarely sold online. This situation causes changes in social habits, food consumption and is followed by sudden changes in consumer behavior towards food.

The city of Bekasi is one of the regions that implements the stay at home or PSBB system. One of the PSBB regulations closes public facilities including shopping centers, making consumption behavior in Pondok Ungu Permai change due to the Covid-19 pandemic. The existence of social distancing makes consumers switch to buying products online.

The purpose of this study was to analyze in fish consumption behavior during the Covid-19 pandemic in Pondok Ungu Permai, to analyze whats factor changes preference in fish consumption during the Covid-19 pandemic, and to analyze the understanding of the benefits of fish from consumers in the Pondok Ungu Permai.

2. METHODOLOGY

The research method used in this research is a case study. Case studies are used to provide an understanding of something that grabs attention, the social process that occurs, or the experience of the person tho is the background of a case.

2.1 Types and Sources of Data

Types and sources of data used are primary data and secondary data. Primary data in this study were obtained directly in the field through direct interviews with respondents using questionnaires. Secondary data obtained from this research comes from available libraries and is related to research topics such as libraries, the internet, and other general information.

2.2 Sampling Technique

The sampling technique used in this research is simple random sampling. Simple random sampling is taking sample members from the population at random without regard to the existing strata in a population and all members of the population have the same opportunity to be used as respondents or samples [3]. In simple random sampling technique, the sampling must be determined beforehand. The number of samples taken in this research was 82 respondents at Pondok Ungu Permai, Bekasi City.

2.3 Data Analysis

This research uses data analysis methods in the form of qualitative analysis, quantitative analysis, and descriptive analysis. Qualitative analysis is used in this research to understand the benefits of fish from consumers. Quantitative analysis is used to describe the general picture or characteristics of society and consumption behavior in Pondok Ungu Permai, Bekasi City by using numbers to facilitate the process of analyzing the data that has been collected. This analysis is generated from interviews and questionnaires that are tabulated in the data, then processed and analyzed according to the analytical method used so that the results can be seen. Data obtained from the quantitative analysis are presented in the form of tables, diagrams, or graphs and then analyzed descriptively.

2.4 Binary Logistic Regression

Binary logistic regression is one of the methods used to find a relationship between the dichotomous dependent variable (nominal or ordinal scale with two categories) with one or more independent variables that are continuous or categorical [4].

$$\frac{pi}{1-pi} = \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \cdots + \beta_8 x_8)$$

Comment [S4]: During COVID-19, the consumer switched to ordering food first (including fish). See: Bouarar, A. C., Mouloudj, S., & Mouloudj, K. (2021). Extending the theory of planned behavior to explain intention to use online food delivery services in the context of COVID -19 pandemic. In C. Cobanoglu, & V. Della Corte (Eds.), Advances in global services and retail management (pp. 1–16). USF M3 Publishing. https://digitalcommons.usf.edu/m3publishing/vol5/iss2021/47/
It is best to include references for any information.

Comment [S7]: How do you do that?
I think it's a non-random sample (please check).

Comment [S8]: How is the sample size determined?

Comment [S5]: add reference

Comment [S6]: What is the survey distribution period?

Explanation :

pi = Probability preference fresh fish
1-pi = Probability preference processed fish
β_0 = Constant
$\beta_1 - \beta_8$ = Regression coefficient
x_1 = Covid
x_2 = Gender
x_3 = Age
x_4 = Number of Family Members
x_5 = Education
x_6 = Work
x_7 = Income
x_8 = Origin Tribe

The parameters tested in preference between fresh fish and processed fish are the model feasibility test, the likelihood ratio test, the coefficient of determination, and the Wald test.

3. RESULTS AND DISCUSSION

3.1 Characteristics of Respondents

Respondent in Pondok Ungu Permai are generally female with 76% and there is tendency of hight female role in the process of household decision making related to daily food needs.

Based on the age of 82 respondents, the majority of respondents are aged 30-39 years with 32 respondents. Between 30-59 years old who have been included in the adult category. This means that most of the respondents tend to be able to think rationally in choosing fishery product purchasing decisions.

The level of education among respondents in this study showed that 53% were bachelor. This shows that respondent have a high level of education. According from the theory, the higher a person's education, the higher one's knowledge will be [5].

Based on the work of 82 respondents, namely 2 students, 26 civil servants / private workers, 46 housewives, and 8 entrepreneurs. The majority of product buyers are housewives because they are usually housewives who arrange food for the household.

Thirty-seven percent (37%) of the respondents had average income IDR 4,000,000-Rp.6.000.000. Income has an important role in the household, because income will affect an important role in the household and has an influence on the frequency of buying fish by consumers.

Seventy nine percent (79%) respondents in Pondok Ungu Permai as a family size of 3 – 5 people. The number of family members of the respondent will influence the decision to buy fish in the family, this is related to the amount to be purchased. The more family members, the greater the need in the family so that consumers will buy fishery products in larger quantities [6].

Based on the ethnicity of the 82 respondents, namely the Sundanese as many as 30 people, Javanese as many as 43 people, Sumatran people as many as 4 people, and for Betawi tribe as many as 5 people. This is in accordance with the statement of Adeng, that ethnographically there are 3 ethnic groups that are quite dominant in Bekasi City, namely the Javanese, Sundanese, and Betawi [7].

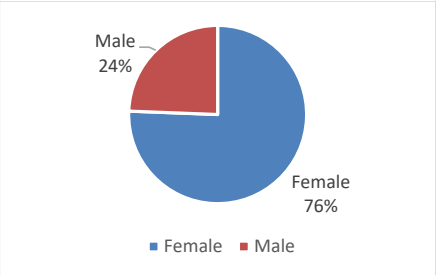

Fig. 1. Frequency distribution of gender

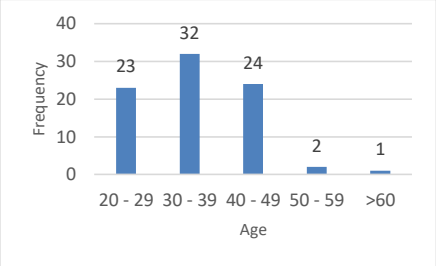

Fig. 2. Frequency distribution of age

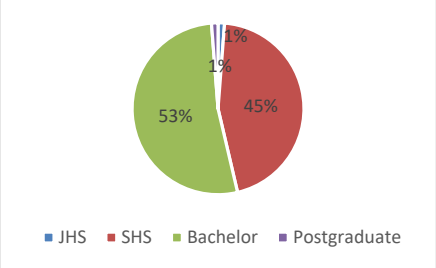

Fig. 3. Frequency distribution of level education

Table 1. Frequency distribution of income

Income (/ month)	Frequency (Person)
<2,000,000	7
2,000,000 – 4,000,000	27
4,000,000 – 6,000,000	30
6,000,000 – 8,000,000	12
>8,000,000	6
Total	**82**

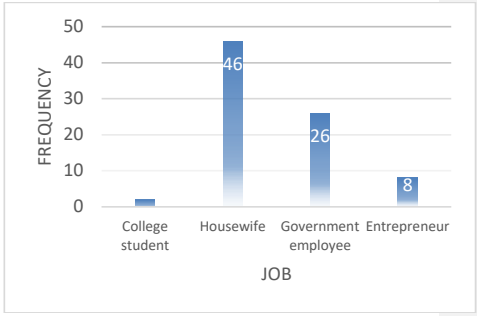

Fig. 4. Frequency distribution of job

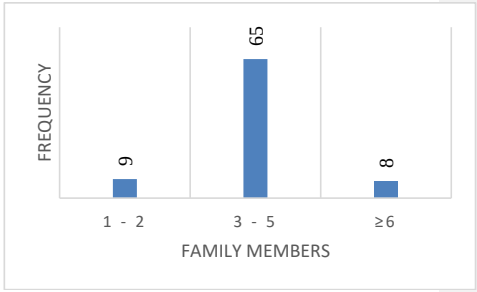

Fig. 5. Frequency distribution of number family members

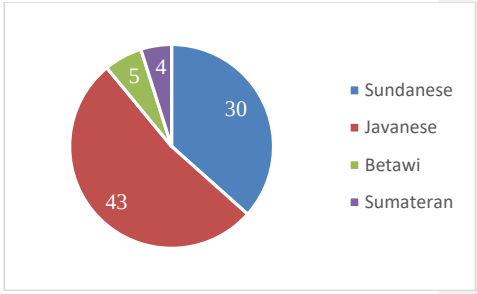

Fig. 6. Frequency distribution of tribe

3.2 Overview of Consumer Preferences for Fishery Products

3.2.1 Respondents Purchasing System

The frequency distribution of respondents based on the purchasing system is presented in Fig 7. In the fish product purchasing system that was carried out by respondents before the Covid-19 pandemic, all respondents used an offline

purchasing system, namely as many as 82 people. The majority of the fish product purchasing system carried out after Covid by respondents is offline, namely as many as 75 people. Consumers consider that direct purchasing is an accurate purchasing model because they can feel and choose products directly.

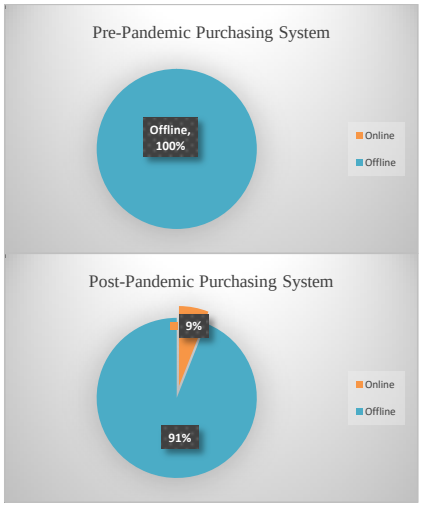

Fig. 7. Frequency distribution based on purchasing system

3.2.2 The Place of Purchase of The Respondents

The frequency distribution of the place of purchase respondents is presented in Fig. 8. The results showed that 90% of the respondents shop at traditional markets before Covid-19 pandemic while 76% shop at traditional markets after Covid-19 pandemic. The majority of respondents to choose where to buy offline both before the pandemic and after the pandemic remained the same, but the number of respondents had changed. This change occurred because at the beginning of the pandemic the government issued a social distancing policy which in people staying at home more often and preferring to shop at online shop.

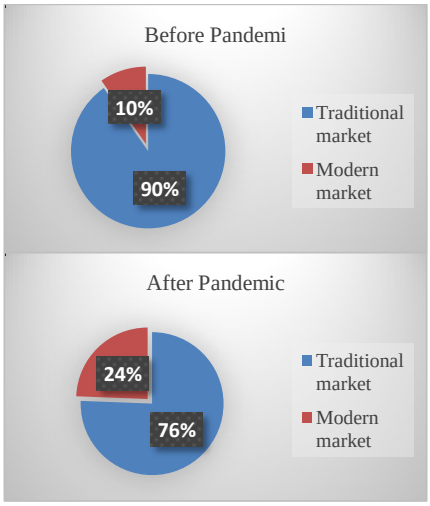

Fig. 8. Frequency distribution based on offline purchase places

3.2.3 Respondents Reasons for Choosing an Online Purchasing System

The majority of respondents revealed that shopping online was easy and safe. Respondents feel safe and prices tend to be cheaper with varoious kinds of discount on products. Based on the respondent's choice, the following reasons for choosing an online purchasing system can be seen in Tables 2.

Table 2. Respondents Reasons for Choosing an Online Purchasing System

Online Reasons	Frequency	Percentage
Easy to access	1	14%
Secure	2	29%
Save time	4	57%

and effort		
Total	**7**	**100%**

3.2.4 Respondents Reasons for Choosing an Offline Purchasing System

Respondents feel more satisfied when buying offline because they can see and feel the texture of the product they are buying. The majority of respondents reasoned that they shop offline because they can hold the product directly, this is very different when consumers shop online. Based on the respondent's choice, the following reasons for choosing an offline purchasing system can be seen in Tables 3.

Table 3. Respondents Reasons for Choosing an Offline Purchasing System

Offline Reasons	Before Pandemic	After Pandemic
Save cost	10	11
Can choose the product directly	61	49
Consumers are satisfied	11	15
Total	**82**	**75**

3.2.5 Frequency of Eating Fish in One Week

The majority of respondents before the pandemic consumed fish in one week, namely twice as much as 40 people, whereas after the pandemic experienced changes, the majority of respondents consume fish in one week that is once that is 43 people. The respondents of Pondok Ungu Permai have decrease in fish consumption in one week for this pandemic. It follows the Marines and Ministry of Fisheries Statement [8] that the demand of the Indonesian people's demand for fish consumption has decreased by 20%. The frequency distribution of respondents frequency of consuming fish in one week is presented in Fig. 9.

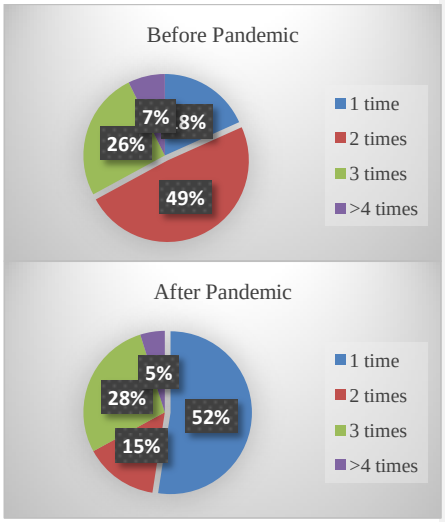

Fig. 9. Frequency distribution based on the frequency of consuming fish in one week

3.2.6 Total Fish Consumption in One Week

The majority of the amount of fish consumption in one week of respondents in Pondok Ungu Permai both before the pandemic and after the pandemic was still the same, namely with a lot <1 kg, but the number of respondents experienced changes.Most consumers buy fish in one time purchase of ½ kg and according to respondents, this amount is sufficient to meet the family consumption needs [9]. The frequency distribution of respondents frequency of total consumption one week is presented in Fig. 10.

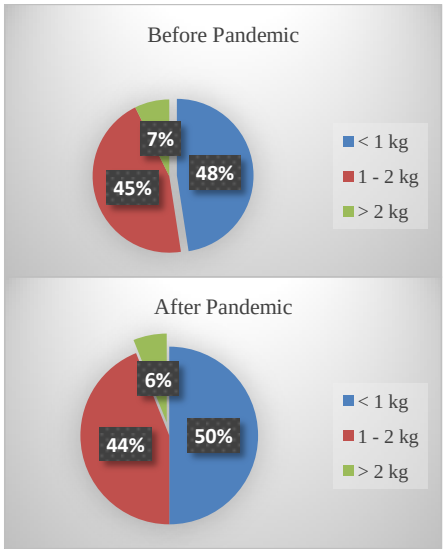

Fig. 10. Frequency distribution based on total fish consumption in one week

3.2.7 Changes in the Amount of Fish Consumption during the Pandemic

The majority of respondents regarding changes in the amount of fish consumption during the pandemic, answered that the amount of fish consumption was fixed, namely 53 people or 65% of the total respondents. The frequency distribution of Changes in the amount of fish consumption during the pandemic is presented in Fig. 11.

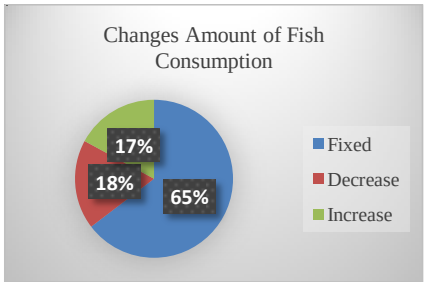

Fig. 11. Changes in the amount of fish consumption during the pandemic

Based on the choices of respondents who experienced the addition and reduction of the amount of fish consumption, here are the reasons for the respondents respectively presented in Tables 4 and 5.

Table 4. Reason for Decreased Fish Consumption During a Pandemic

Reasons	Frequency	Percentage
Income decreased	8	53%
There are fewer fish marketers	3	20%
Over the majority of other products	4	27%
Total	**15**	**100%**

Table 5. Reason for Increase Fish Consumption During a Pandemic

Reasons	Frequency	Percentage
The importance of consuming fish during a pandemic	6	43%
Increased love of fish	3	21%
Family members gather during the pandemic	5	36%
Total	**14**	**100%**

3.2.8 Type of Fish Frequently Consumed by Respondents

Before the pandemic, respondents consumed fresh fish products more often, as much as 69 people, whereas after the pandemic, respondents consume more fresh fish products, because as many as 73 people. Most fish products which was more often consumed by Pondok Ungu Permai respondents both before the pandemic and after the pandemic has not changed, but the number of respondents has changed. People prefer fresh fish compared to processed fish because fresh fish tastes better, and fresh fish contains better nutrition and can be served in various types of foods. The frequency distribution of fish products consumed is presented in Fig. 12.

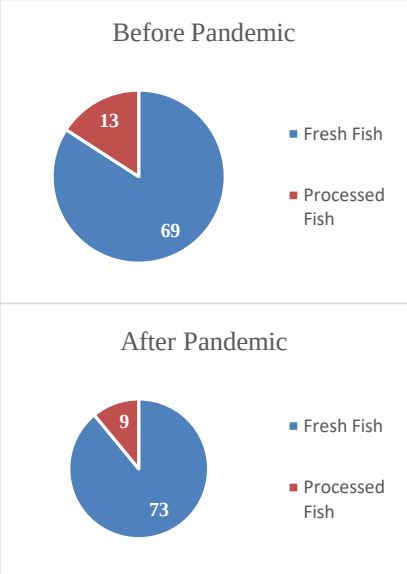

Fig. 12. Respondents frequency distribution based on fish products consumed more often

Based on respondents' choices, the following reasons for choosing fresh fish before and after the pandemic can be seen in Table 6.

Table 6. Reason for Fresh Fish More Often Consumed by Respondents Before and After Pandemic

Reasons for Fresh Fish	Before Pandemic	After Pandemic
It tastes better	18	18
Hish in nutrition	31	30
Easy to get	11	10
Safer and hygiene	3	2
Affordable price	6	13
Total	**69**	**73**

Based on respondents' choices, the following reasons for choosing processed fish before and after the pandemic can be seen in Table 7.

Table 7. Reason for Processed Fish More Often Consumed by Respondents Before and After Pandemic

Reasons for Processed Fish	Before Pandemic	After Pandemic
It tastes better	8	4
Hish in nutrition	2	0
Safer and hygiene	3	5
Total	**13**	**9**

3.2.9 Type of Fresh Fish Frequently Consumed by Respondents

The majority of fresh fish products are more frequently consumed by Pondok Ungu Permai respondents both before the pandemic and after the pandemic doesn't change, but the quantity respondents have changed. Before pandemic, 65 respondents choose fresh fish, but after the pandemic increased to 69 people. Before the pandemic, 17 respondents choose fresh sea fish, but after the pandemic, that reduced to 13 people. The majority of people generally choose fresh water fresh fish because they consider the taste of the fish meat, the freshness of the fish, the price of fish, and the ease of obtaining fish products [10].

Based on respondents' choices, responden frequency distribution based on the types of fresh fish consumed more often can be seen in Table 8.

Table 8. Respondents Frequency Distribution Based on the Types of Fresh Fish Consumed More Often

Fresh Fish Type	Before Pandemic	After Pandemic
Fresh fresh fish	65	69
Sea fresh fish	17	13
Total	**82**	**82**

3.2.10 Type of Processed Fish Frequently Consumed by Respondents

The majority processed fish products consumed more often by respondents in Pondok Ungu Permai both before the pandemic and after The pandemic doesn't change, but the quantity respondents experienced a change, namely choosing fish jelly. Study results following Indiarto's research [11], during the Covid-19 pandemic, sales of processed fish products tended to be highly dominated by the public due to the change in people who eat in restaurants turning to cooking themselves by cooking practical and ready-to-eat foods such as processed fish products. Based on respondents' choices, responden frequency distribution based on the types of processed fish consumed more often can be seen in Table 9.

Table 9. Respondents Frequency Distribution by Type of Processed Fish which is More Frequently Consumed

Type of Processed Fish	Before Pandemic	After Pandemic
Pindang Fish	19	19
Canned Fish	8	5
Fish Jelly	43	45
Salted Fish	12	13
Total	**82**	**82**

3.2.11 Respondents Knowledge Regarding the Benefits of Fish Consumption

The majority of respondents' knowledge of the benefits of fish consumption is that 75 respondents know the benefits of the fish consumption. Based on the research results, the average respondent knows the benefits of fish consumption, namely for body health, contains high protein and nutrients contained in fish. Public knowledge shows that almost all respondents, as many as 92.86%, know about the nutritional content of fish and the benefits of fish [12].

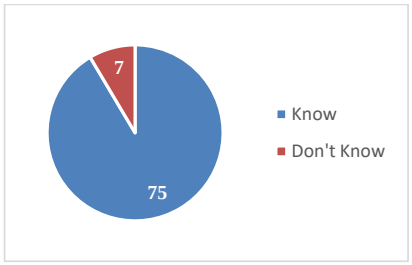

Fig. 13. Respondents frequency distribution based on knowledge of the benefits of fish consumption

3.2.12 Respondents Knowledge Regarding the Benefits of Fish Consumption During the Pandemic

The majority of respondents' knowledge of the benefits of fish consumption during a pandemic, as many as 68 respondents, knew about the benefits of fish consumption during a pandemic. Based on the results of the research, the average respondent knows the benefits of fish consumption, namely for body health, increasing body immunity or immunity, and preventing disease. The 60% of participants or respondents have heard or known about the benefits of fish, but there are still people who do not know the benefits of fish during a pandemic [13].

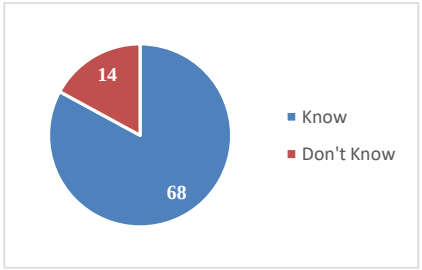

Fig. 14. Respondents frequency distribution based on knowledge of the benefits of fish consumption during the pandemic

3.2.13 Respondents Observations Regarding the Market for Fish Species Obtained

The majority of respondents regarding observations of the market for fish species obtained, namely that the answer was not reduced, as many as 73 people or 89% of the total respondents and some respondents, namely as many as 9 people or 11% answered that it was reduced. The occurrence of fish products is reduced in the market because fishermen's catch is difficult to get to the market, Fishermen's catch is not absorbed by the market due to distribution and logistical constraints so that the selling price at the fishermen level falls [14].

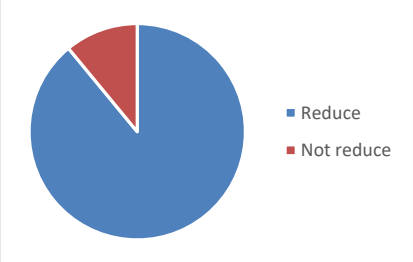

Fig. 15. Respondents frequency distribution based on observations of the reduce in fish product

3.2.14 Respondents Observations Regarding the Increase for Fish Prices

The majority of respondents regarding observations of the increase in fish prices were not as many as 67 people. Fish prices have not increased or even decreased, the Coronavirus outbreak has an impact on fisheries marketing, where fish prices have decreased by 50% [15].

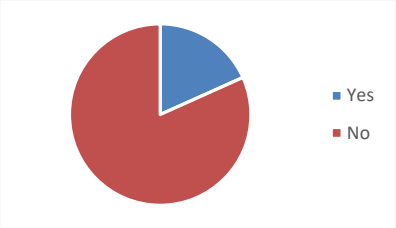

Fig. 16. Respondents frequency distribution based on observations of the increase in fish prices

3.3 Preference Between Fresh Fish and Processed Fish Before and After The Covid-19 Pandemic

3.3.1 Feasibility Test Model

The results of the calculation of Hosmer and Lemeshow's Goodness of Fit Test before and after the pandemic show that the chi-square significance value is 0.295 (>0.05), greater than the 0.05 significance level, this means that the model is acceptable because it fits the observation data and the regression model. Feasible for use in further analysis.

Table 10. Hosmer and lemeshow test

Step	Chi-square	Df	Sig
1	9.586	8	.295

3.3.2 Likelihood Ratio Test

The results of the calculation of the Likelihood Ratio Test before and after the pandemic show a value of 114,024 > Chi-square table = 14.0671, which means that with a 95% confidence level the independent variables simultaneously influence the independent variables.

Table 11. Likelihood Ratio Test

Step	-2 Log like-lihood	Cox &Snell R square	Nagel-kerke R Square
1	114.024[a]	.089	.163

3.3.3 Coefficient or Determination

Nagelkerke R Square in Pondok Ungu Permai before and after the Covid-19 pandemic, which was 0,163 which stated that the ability of the independent variables to explain the dependent variable was 16,3% and the remaining 83,7% was explained by other variables outside the variables used in this model. Variables that influence consumers to buy fresh fish, namely 86%, influenced by price, taste, fish quality, and consumer income [16].

Table 12. Nagelkerke R Square

Step	-2 Log like-lihood	Cox &Snell R square	Nagel-kerke R Square
1	114.024[a]	.089	.163

3.3.4 Wald Test

Based on Wald's test results before and after pandemic, the job factor has a Wald test score of 8.196 and a significance value of 0.042 which means that the importance of work factor is smaller than the level of significance (>0.05) which proves the work affect the preference between fresh and processed fish before and after the pandemic. The higher it is respondent's job, the higher preferences for fish consumption.

4. CONCLUSION

Based on the results of the study, it shows that the frequency of fish consumption in one week has changed, before the pandemic, most respondents (49%) consumed fish twice a week, while in the pandemic phase, most respondents (52%) consumed fish only once a week. Changes in the amount of fish consumption during the pandemic, namely 65% fixed consumption, 18% decrease, and 17% increase. It is possible to say that the pandemic event has halved the consumption of fish in the considered area.

The product purchasing system, where to buy fish, the amount of fish consumed in one week, the types of fish that are often consumed, the types of fresh fish that are often consumed, and the types of processed fish that are often consumed, have not changed for the majority of respondents both before and after the pandemic, but for the number of respondents experiencing changes.

Understanding the benefits of fish from consumers in Pondok Ungu Permai, the majority of consumers (91%) know the benefits of consuming fish for brain intelligence, body health, containing high protein and nutrients contained in fish. Understanding the benefits of fish during the pandemic from consumers at Pondok Ungu Permai, the majority of consumers (83%) know the benefits of consuming fish during a pandemic, for body health, increasing body immunity and preventing disease.

REFERENCES

1. Ministry of Health of the Republic of Indonesia. Regulation of the Minister of Health of the Republic of Indonesia Number 9 of 2020 concerning guidelines for scale of social restrictions in accelerating handling of corona virus disease 2019 (COVID-19); 2020.
2. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia. KKP prepares COVID-19 impact strategy for fishery businesse; 2020. Accessed 01 November 2020. Available:https://kkp.go.id/artikel/18291- kkp-siapkan-strategi-antisipasi-dampakcovid-19-bagi-usaha-perikanan
3. Sugiyono. Combination Research Methods (Mix Methods). Bandung: Alphabeta ; 2015.
4. Fadhilah AR, Notobroto HB. Binary Logistic Regression Analysis on Transient Inschemic Attact (Tia) at Dr.

Soetomo Surabaya. Jpurnal Biometrics and Population. 2016;5(2).
5. Riskesdas. Basic health research in central java province. Jakarta: Ministry of Health of the Republic of Indonesia; 2010.
6. Tunjungsari F. Analysis of consumer behavior on purchasing red snapper in traditional markets in Surakarta. Thesis. Surakarta: Sebelas Maret University; 2009.
7. Adeng, A. Social History of Bekasi City. Patanjala: Journal of Historical and Cultural Research. 2014: 6(3), 397.
8. Marine and Fisheries Ministry. Impact of Covid-19 on Fisheries (Tuna) in the SKPT of Morotai Island Regency, North Maluk Province; 2020. Available:https://kkp.go.id/Morotai/artikel/1 9012-dampak-covid-19-terhadapperikanan-tuna-di-skpt-kabamatan-pulaumorotai-provinsi-maluku-utara.
9. Usnia K, Kusai, Zulkarnain. Consumer Behavior in Buying Salai Fish at Pasar Bawah Kota Pekanbaru, Riau Province. Coastal Socio-Economic Journal. 2020;1(2).
10. Apasha, S. R., & Yanti, N. D. Consumer Preferences on Fresh Fish and Marine Fish in Bauntung Traditional Market, Banjarbaru City. 2015.
11. Indiarto. In The Midst of Covid-19 Pandemic, Fish Product are Being Haunted by Consumers; 2020. Accessed 6 April 2022. Available: https://tabloidsinartani.com/detail/indeks/akuamina/13560-Di-Tengah-Pandemi-Covid-19-Produk-Perikanan-Diburu-Konsumen/
12. Hendrawati S, Zidni I. Description of Fish Consumption in Families and Children PAUD RW 07 Cipacing Village. Journal of Community Service. 2017;1(2).
13. Sofiana MSJ, Yuliono A, Warsidah Safitri. Socialization of Marine Food Utilization and Diversification of Its Processes as Efforts to Overcome Stunting in Children of Balitri in West Kalimantan. Journal of Community Engagement in Health. 2021;4(1).
14. Firdaus Ichsan. Fisheries Management during the Covid-19 Pandemic. Jakarta: Ministry of Maritime Affairs and Fisheries; 2020.
15. Nurhayati A, Pical V, Efani A, Hilyaa S, Saloko S, Made S, Purnomo AH. Capture Fisheries Risk Management (Case Study in the Middle of the Covid-19 Pandemic). Journal of Fisheries and Marine Research. 2020;4(3).
16. Ufat MR, Yusuf S, Nurdiana A. Analysis of Factors Affecting Consumer Decisions in Purchasing Fish at the Fish Landing Base in Kendari City. Journal of Fisheries Social Economics. 2017; 2(1).